Improving feedlot efficiency through feed resource optimization

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Although the U.S. cowherd is at its lowest since the1950s, there remains a focus on increasing the efficiency of production rather than maximizing total output. The feedlot sector benefits greatly from the availability of hormone implants, beta agonists, ionophores as well as products for disease prevention and treatment to improve animal efficiency. The combined impact of beef production technologies on animal efficiency is significant, with estimates of 25% (Wileman et al., 2009) and 45% (Lawrence and Ibarburu, 2007). The realities of the cost and time involved in the development of new technologies, as well as an increasingly vocal portion of the public with negative views on the use of such technology, likely limits the number of new products entering the marketplace for the foreseeable future. Unperceived or previously ignored inefficiencies in basic sub-systems offer an alternative opportunity to improve feedlot efficiency and profitability.

Feed remains the most expensive animal input during finishing; however, attention to feedstuff losses is generally constrained to periods of high feed prices and forgotten as prices cycle down. Feed losses occur during harvest or procurement, storage, transfer to feed mixers and at bunk line delivery. Beyond delivery, bunk management can have a significant impact of feed waste over time. Estimates of these losses are difficult to measure and are dependent on a number of variables distinct to each individual feedlot.

Forage dry matter (DM) losses during harvest have been estimated to range from 5% to 30% (USDA ARS, 2012). Forage DM loss from bunker or pile silos ranges from 5% to 25% during ensiling and 5% to 20% during feeding (USDA ARS, 2012). Dry matter loss from bag silos during ensiling ranges from 2% to 30% and 5% to 15% during feed-out (USDA ARS, 2012). Plastic silo bags are an affordable and convenient means of forage storage; however, spoilage of 15% to 100% has been associated with holes in plastic due to wildlife or equipment (Muck and Holmes, 2001). Measures of feed loss during storage in 3-sided bays range from 5% to 40%, depending on ingredient type and moisture level (Kertz, 1998).

Transporting feed from storage facilities to mixer loading area has been associated with losses ranging 1% to 5%, depending on distance from feed storage and feed staging practices (Jaderborg and DiCostanzo, 2012). A 0.5% to 1% loss has been associated with wind and wildlife predation (Jaderborg and DiCostanzo, 2012). Feed loss during mixer loading has been measured at 0.5% to 2% (unpublished data). Feed loss during bunk line delivery, although often negligible, is highly dependent on operator skill.

Based on the values derived by Kertz (1998), calculated weighted shrink and spoilage alone for ingredients in a ration containing 45% dry rolled corn, 20% modified distillers grains with solubles, 15% corn silage, 10% grass hay and 5% dry supplement is 10%. This alone would offset the improvement in efficiency afforded by use of growth implants, which is estimated to be 9% (Lawrence and Ibarburu, 2007; Wileman et al., 2009).

A number of small and relatively easy to implement management changes can be employed to reduce feed loss. More dramatic changes can be realized through investment in more substantial infrastructure for feed storage and feed staging/mixing. A 5% reduction in feed loss, from procurement through actual animal consumption of a ration costing $120/ton is only $6/ton. Working through a simple example it is apparent the significance that a 5% reduction can make over a year. Feeding a steer from 700 lb to 1450 lb at finish with a feed conversion of 4:1 will require 1.5 ton of feed. A feedlot with a capacity of 1,000 head with 2 turns per year will consume 3,000 ton feed/year. A 5% reduction in feed loss of a ration costing $120/ton over the period of a year for a 1,000 head feedlot results in a savings of $18,000. Optimizing protocols and facilities to retain feed efficiency from procurement through animal consumption offers an opportunity to make small but meaningful changes in feedlot efficiency and ultimately profitability.

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